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10/821,172

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Jin-ho Kim

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EXAMINER

KOCA, HUSEYIN

ART UNIT

PAPER NUMBER

3744

MAIL DATE

DELIVERY MODE

10/17/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary**

Application No.

10/821,172

Applicant(s)

KIM ET AL.

Examiner

Huseyin Koca

Art Unit

3744

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 August 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-4, 6, 7, 10-14 and 19-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6, 7, 10-14, and 19-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1-3, 7, 11, 12, 14, 19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harbers (2,728,204), and further in view of Lakdawala et al. (6,435,265).

In regard to claim 1, Harbers teaches an evaporator forming frost having a coolant tube (13) which is bendable (Fig. 1); heat exchange fin (12) with a coolant tube accommodating part contacting the coolant tube (see Fig. 1 below); a defrosting unit to remove the frost formed on the evaporator (defrosting unit is inherent because during the defrosting period, there has to be a defrosting unit C-1, L-37-39); the heat exchange fin is inclined by an inclination angle formed between a vertical direction and longitudinal direction being an acute angle relative to the vertical direction (see Fig. 1 below); the

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heat exchange fin has rounded corner parts on opposite sides (see Fig. 1 below); and a bottom end below the corner parts where the inclination angle causes the water drops flow downward (see Fig. 1 below). Harbers do not explicitly teach that the evaporator is installed on a wall, and the bottom end of the at least one heat exchange fin is adjacent to the wall on which the evaporator is installed. Lakdawala et al. teach that the evaporator is installed on a wall (11), and the heat exchange fin (5) is inclined toward one side relative to the vertical direction, and the bottom end of at least one heat exchange fin is adjacent to the wall (11) on which the evaporator is installed (C-3, L-55-59; Fig. 2). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Harbers teaching so that the evaporator is installed on a wall and the bottom end of the at least one heat exchange fin is adjacent (next to) to the wall on which the evaporator is installed as a result of inclination as taught by Lakdawala et al. in order to advantageously guide flowing of a defrosted water.

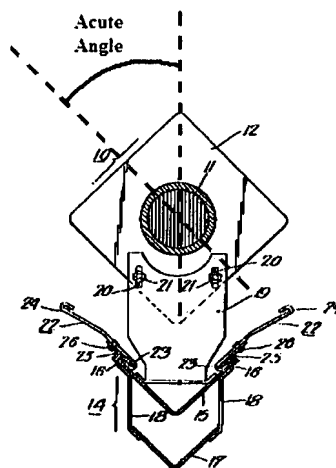


Fig. 1 – Fig. 2 of Harbers (2,728,204)

In regard to claims 2, 19, and 20, Harbers's heat exchange fin includes rounded corner parts but he does not explicitly teach the dimensional value of the radius. The one of ordinary skill in the art would have recognized that a heat exchange fin size can be different depending on the application. For example, bigger refrigerators that use bigger cooling tubes have larger fins. The size of the fin can be an affecting factor for the dimension of the radius on the rounded corners. Further, one of ordinary skill in the art would have known that rounded corners would result less stress on the fin surface. Thus, dimension of the radius on the corner will also affect the stress distribution on the fin surface. It would have been obvious to one having ordinary skill in the art at the time the invention was made to round the corners of the fin between 5 and 20 mm to avoid sharp edges and to be able to minimize the stress on the fin surface. Fins with rounded edges will make the installation process safer and it will help to avoid possible injuries. One of ordinary skill in the art would have arrived at these dimensions without undue experimentations.

In regard to claims 3 and 11, Harbers teach most of the limitations of the claim but do not explicitly teach that the inclination angle of the heat exchange fin is between approximately 50 degrees and 75 degrees or 40 degrees and 50 degrees. Lakdawala et al. teach that the fins at acute angle to the vertical (C-3, L-64-67). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to set the angle between approximately 50 degrees and 75 degrees or 40 degrees and 50 degrees as taught by Lakdawala et al. in Harbers refrigeration apparatus to adjust the amount of airflow between the fins, and also to avoid contacting

the (other) pipes when the condensate drops down the fin in order to advantageously increase the efficiency of the system.

In regard to claim 7, Lakdawala et al. teach that the heat exchange fin (5) has a substantially rectangular shape, and at least one coolant tube accommodating part (7A) is positioned on a surface of the heat exchange fin in a pair (see Fig. 2).

In regard to claim 12, Harbers teaches that when the fin is inclined, it changes its position from rectangle (square) shape to diamond shape which changes the overall height of the fin. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to know that the inclination angle of the heat exchange fin is based on the length of the heat exchange fin and the distance between the coolant tubes along vertical direction in order to avoid the heat exchange fin hitting the below tube and the below heat exchange fin after it is being inclined.

In regard to claim 14, Harbers teach that the heat exchange fin has polygonal shape (Fig. 2).

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Harbers (2,728,204) and Lakdawala et al. (6,435,265), and further in view of Tanaka et al. (4,715,437).

In regard to claim 4, Harbers in view of Lakdawala et al. teach most of the limitations of the claim but do not explicitly teach at least one protrusion from a surface of the heat exchange fin. Tanaka et al. teach that the heat exchange fin includes at least one protrusion (24) protruding orthogonally from a surface of the heat exchange fin (C-5; L-1). It would have been obvious to one having ordinary skill in the art at the time the

invention was made to have protrusion from a surface of the heat exchange fin as taught by Tanaka et al., in Harbers in view of Lakdawala et al. refrigeration apparatus to realize the evaporator fin having a low pressure loss and a high heat transfer rate in order to advantageously increase the efficiency of the evaporator.

5. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Harbers (2,728,204) in view of Lakdawala et al. (6,435,265) as applied to claim 1 above, and further in view of Jasper, II et al. (5,552,581).

In regard to claim 6, Harbers in view of Lakdawala et al. teach most of the limitations of the claim but do not explicitly teach coolant tube supporters on opposite sides of the evaporator. Jasper, II et al. teach two coolant tube supporters (40, 42) on opposite sides of the evaporator supporting the coolant tube (C-2; L-32-34). It would have been obvious to one having ordinary skill in the art at the time the invention was made to use coolant tube support as taught by Jasper, II et al. in Harbers in view of Lakdawala et al. refrigeration apparatus in order to support the coolant tubes of the evaporator in order to advantageously keep the fins, the cooling tube and the evaporator sturdy and prevent them getting damaged during operation.

6. Claims 10 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harbers (2,728,204) in view of Lakdawala et al. (6,435,265) as applied to claim 1 above, and further in view of Ho (5,499,514).

In regard to claim 10, Harbers and Lakdawala et al. teach most of the limitations of the claim but do not explicitly teach that the refrigerator comprising a main body having at least one storage compartment having an opening supplied with the cooling

air generated by the refrigeration apparatus, and at least one door covering the opening of the storage compartment. Ho teaches a main body including a storage compartment (14) supplied with cooling air generated by the refrigeration apparatus (C-3; L-29-30) and a door covering the opening of the storage compartment (C-3; L-14-15). It would have been obvious to one having ordinary skill in the art at the time the invention was made to include a storage compartment and a door as taught by Ho in the system of Harbers in view of Ladawala et al. in order to advantageously prevent stored products being in contact with the ambient air. Additionally, it is inherent for refrigerator to have a main body that has storage compartment and a door.

In regard to claim 13, Ho teaches that the water is disposed in an evaporator accommodating part containing the evaporator (C-3; L-54-61).

7. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Harbers (2,728,204) in view of Lakdawala et al. (6,435,265), and further in view of Maudlin (3,750,418).

In regard to claim 21, Harbers in view of Lakdawala et al. teach most of the limitations of the claim but do not explicitly teach that the heat exchange fin includes one sharply-edged corner. Maudlin teaches a heat exchange fin which contains a sharply-edged corner (22) (C-2, L-40-43; also see Fig. 2). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have at least one sharply-edged corner as taught by Maudlin, in Harbers in view of Lakdawala et al. refrigeration apparatus to accurately bring the moisture to condensate collector which



will advantageously improve the efficiency of draining the condensate moisture and as a result improve the efficiency of the fins.

### ***Response to Arguments***

8. Applicant's arguments filed 08/09/2007 have been fully considered but they are not persuasive.

1. Applicant argues the rejection under 35 U.S.C. 102(b) under Harbers regards to claim 1 by amending the claim 1 and including the limitations of claim 5.

In response, the arguments for the rejection under 35 U.S.C. 102(b) under Harbers regards to claim 1 is moot in view of new grounds of rejection under 35 U.S.C. 103(a) under Harbers in view of Lakdawala et al. The prior art references, Harbers and Lakdawala et al., create a prima facie case of obviousness to one of ordinary skill in the art at the time of the invention.

2. Applicant argues the rejection under 35 U.S.C. 103(a) under Harbers in view of Lakdawala et al. regards to claim 5 (which is the new claim 1) as the bottom end of the heat exchange fin is in contact with the wall of the evaporator accommodating part.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the heat exchange fin is in contact with the wall of the evaporator accommodating part) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are

not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Additionally the word “adjacent” was interpreted as “next to”.

3. Applicant argues the rejection under 35 U.S.C. 103(a) under Harbers in view of Lakdawala et al. regards to claim 5 (which is the new claim 1) as inner wall is used for collecting defrosted water.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., inner wall is used for collecting defrosted water) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

4. Applicant argues the rejection under 35 U.S.C. 103(a) under Ho and further in view of Harbers regards to claim 10 as the heat exchange fin is adjacent to the wall is not discussed in either Ho or Harbers.

In response, the arguments for the rejection under 35 U.S.C. 103(a) under Ho and further in view of Harbers regards to claim 10 is moot in view of new grounds of rejection under 35 U.S.C. 103(a) under Harbers in view of Lakdawala et al. and further in view of Ho. The prior art references, Harbers, Lakdawala et al. and Ho, create a prima facie case of obviousness to one of ordinary skill in the art at the time of the invention. Lakdawala et al. teach that the heat exchange fin is adjacent to the wall (see claim rejection).

***Conclusion***

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Huseyin Koca whose telephone number is (571) 272-3048. The examiner can normally be reached on Monday - Friday 9:00AM to 4:00PM.

11. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl Tyler can be reached on (571) 272-4834 or Frantz Jules (571) 272-6681. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

12. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for

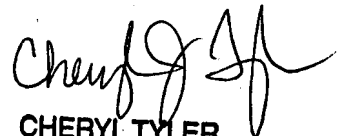
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published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/HK/

  
CHERYL TYLER  
SUPERVISORY PATENT EXAMINER